



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> <b>Amreeta K. Gill</b>	<b>Project Number</b> <b>S0706</b>
<b>Project Title</b> <b>Energy Crisis! Is Hydrogen the Solution?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My objective is to determine if the efficiency of a solar hydrogen system can be improved to produce and use hydrogen effectively as an energy carrier, using the natural and renewable resources of solar energy and water. <b>Methods/Materials</b> -The control experiment was conducted with four solar panels at an angle of incidence of light of 0 degree, and a fan and a car as the load on the fuel cell. This determined the efficiency of the control setup. -In the experimental setup, the angle of incidence was varied from 0 degree to 90 degrees and the voltage and current was measured to determine the optimal angle of incidence. -Keeping the optimal angle of incidence and the output load on the fuel cell constant, the number of solar panels was increased from one to four and the efficiency measured. -Finally, with the optimal angle of incidence and four solar panels, the output load on the fuel cell was varied, and the efficiency was once again measured. -Materials: Solar panels, an electrolytic cell, a hydrogen storage tank , a fuel cell with a Nafion 117 PEM with platinum coating, a miniature car, fan and multimeter etc. <b>Results</b> The efficiency of the system in the control setup was determined to be 13.08%. In the experiment setup, an increase in the input voltage to the electrolytic cell increased the efficiency by 50.23% as compared to the control setup. Increasing the load on the fuel cell resulted in an increased efficiency of 18.73% compared to the control setup. <b>Conclusions/Discussion</b> My experiment shows that increasing the input voltage to the electrolytic cell resulted in an increased efficiency as the increase in the electric charge promoted the decomposition of water. Increasing the output load on the fuel cell increased the efficiency, since more of the electrons were utilized in the electrical circuit of the fuel cell.	
<b>Summary Statement</b> My project involves the use of natural and renewable resources of solar energy and water to produce and utilize hydrogen and attempts to determine if the efficiency of the solar hydrogen system can be improved.	
<b>Help Received</b> My science teacher, Mr. Kirkpatrick, provided guidance and feedback on the project. My parents helped me in buying and assembling the equipment and assisted in constructing the display board.	